

## WHAT IS CLAIMED IS:

1. A switchable high frequency bandpass filter comprising:

an input node and an output node;

5 a switchable LC resonator coupled between the input node and the output node for providing a plurality of switchable filter transfer functions for a plurality of high frequency signals having different frequencies transmitted from the input node to the output node; and

a switch signal input interface circuit coupled to the switchable LC resonator,

10 wherein a switch signal is applied to the switchable LC resonator through the switch signal input interface circuit for controlling the switchable LC resonator to provide the plurality of high frequency signals having different frequencies with a suitable one of the plurality of switchable filter transfer functions.

2. The switchable high frequency bandpass filter according to claim 1, wherein the switchable LC resonator comprises:

15 an inductive unit coupled between the input node and ground;

a first capacitive unit coupled between the input node and ground such that the inductive unit and the first capacitive unit construct a first-state parallel LC resonant circuit; and

20 a second capacitive unit coupled between the input node and ground such that the inductive unit, the first capacitive unit, and the second capacitive unit construct a second-state parallel LC resonant circuit.

3. The switchable high frequency bandpass filter according to claim 2, wherein the switch signal is a DC voltage signal having a predetermined lower voltage level and a predetermined higher voltage level, and the second capacitive unit is enabled when the switch signal is at the  
25 predetermined lower voltage level, and the second capacitive unit is disabled when the switch signal is at the predetermined higher voltage level, resulting in that the switchable LC

resonator switches in configuration between the first-state parallel LC resonant circuit and the second-state parallel LC resonant circuit.

4. The switchable high frequency bandpass filter according to claim 3, further comprising:

5 a DC blocking circuit for blocking a DC signal, having a first terminal coupled to the output node and a second terminal used as a common high frequency output terminal.

5. The switchable high frequency bandpass filter according to claim 4, wherein the DC blocking circuit is constructed by a capacitive element having a terminal used as the first

10 terminal and another terminal used as the second terminal.

6. The switchable high frequency bandpass filter according to claim 3, further comprising:

a high frequency signal generator coupled to the input node for generating the plurality of high frequency signals having different frequencies and controlled by the switch signal  
15 such that only one of the plurality of high frequency signals is input into the input node at any time.

7. The switchable high frequency bandpass filter according to claim 6, further comprising:

a buffer coupled between the high frequency signal generator and the input node.

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8. The switchable high frequency bandpass filter according to claim 6, wherein the high frequency signal generator comprises:

a first frequency generation circuit coupled between a tuning voltage and the input node for generating a first high frequency signal having a first frequency, and

25 a second frequency generation circuit coupled between the tuning voltage and the input node for generating a second high frequency signal having a second frequency,

wherein the second frequency is larger than the first frequency, and the second frequency generation circuit is enabled when the switch signal is at the predetermined lower voltage level, thereby allowing the second high frequency signal to be input into the input node, and the first frequency generation circuit is enabled when the switch signal is at the predetermined  
5 higher voltage level, thereby allowing the first high frequency signal to be input into the input node.

9. The switchable high frequency bandpass filter according to claim 8, wherein the second frequency of the second high frequency signal is substantially twice as high as the first  
10 frequency of the first high frequency signal.

10. The switchable high frequency bandpass filter according to claim 8, wherein each of the first frequency generation circuit and the second frequency generation circuit is formed by a voltage control oscillator.

15 11. The switchable high frequency bandpass filter according to claim 2, wherein the inductive unit comprises:

a first inductor having a terminal coupled to an external DC voltage source and another terminal coupled to both of the input node and the output node, and

20 a first capacitor having a terminal coupled to the external DC voltage source and another terminal coupled to ground.

12. The switchable high frequency bandpass filter according to claim 2, wherein the first capacitive unit comprises:

25 a second capacitor having a terminal coupled to both of the input node and the output node, and another terminal coupled to ground.

13. The switchable high frequency bandpass filter according to claim 2, wherein the second capacitive unit comprises:

a third capacitor having a terminal coupled to both of the input node and the output node;

5 a diode having a P electrode for receiving the switch signal and an N electrode, the P electrode being coupled to another terminal of the third capacitor and the switch signal input interface;

a fourth capacitor coupled in series between the N electrode of the diode and ground; and

a resistor coupled in series between the N electrode of the diode and ground.

10 14. The switchable high frequency bandpass filter according to claim 13, wherein the switch signal is a DC voltage signal having a predetermined lower voltage level and a predetermined higher voltage level, and the switch signal cannot turn on the diode when the switch signal is at the predetermined lower voltage level, and the switch signal can turn on the diode when the  
15 switch signal is at the predetermined higher voltage level.

15. The switchable high frequency bandpass filter according to claim 13, wherein the switch signal input interface circuit comprises:

a second capacitor having a terminal coupled to the P electrode of the diode and another  
20 terminal for receiving the switch signal, and

a fifth capacitor having a terminal coupled to the another terminal, for receiving the switch signal, of the second capacitor and another terminal coupled to ground.